# IMPACT OF RESISTANCE AND COMPLEX TRAINING ON SPEED AND AGILITY AMONG WOMEN KABADDI PLAYERS

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# ABSTRACT

The purpose of the study was to find out the impact of resistance and complex training on speed and agility among women kabaddi players. To achieve the purpose of the study, forty five women kabaddi players were selected from Queen Mary's College Chennai. The subject's age ranged between 18-23 years. The selected subjects were divided into three equal groups of fifteen each. Group - I (n = 15) underwent Resistance Training (RT), Group - II (n = 15) underwent Complex Training (CT) and Group- III (n = 15) acted as control. The collected data from the three groups prior to and post experimentation on speed and agility were statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). Since three groups were involved, whenever the obtained 'F' ratio value was found to be significant for adjusted post test means, the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. The result of the study revealed that twelve weeks of resistance and complex training had an impact to increase on speed and agility of women kabaddi players. It was concluded that from the results of the study both resistance and complex training is essential for the improvement of the speed and agility of women kabaddi players.

Key words: Resistance, complex training, speed and agility.

#### **INTRODUCTION**

**Resistance training** increases muscle strength by pitting muscles against a weight, such as a dumbbell, barbell or other type of resistance. A rubberized band can even be used. Resistance training can increase muscle strength and bone density and reduce body fat. Resistance training, also called weight training or strength training, is pitting muscles against a resistance such as a weight or other type of resistance, to build the strength, anaerobic endurance, and/or size of skeletal muscles. A well-rounded program of physical activity includes strength training, to improve bone, joint function, bone density, muscle, tendon and ligament strength, as well as aerobic exercise, to improve our heart and lung fitness. The body's basal metabolic rate increases with increases in muscle mass, which promotes long-term fat loss and helps dieters avoid yo-yo dieting. Moreover, intense workouts elevate metabolism for several hours following the workout, which also promotes fat loss (De Mello and Gomes, 2004).

**Complex training** also known as contrast training or post-activation potentiation training, involves the integration of strength training and plyometrics in a training system designed to improve explosive power. Strength training and plyometric training are both effective measures for increasing athletic performance independent of each other, but a true program designed for power-based athletes needs to incorporate both disciplines. The goal of this type of training is to acutely or over long-term training enhance power output in tasks such as jumping, sprinting, and throwing a ball (Fleck and Kraemer, 2013).

**Kabaddi** is the team game where seven players in the court will play as a unit. Kabaddi is basically an outdoor team game, played in the tropical countries of Asia.

### **METHODOLOGY**

### Subjects and Variables

The purpose of the study was to find out the impact of resistance and complex training on speed and agility among women kabaddi players. To achieve the purpose of the study, forty five women kabaddi players were selected from Queen Mary's College Chennai. The subject's age ranged between 18-23 years. The selected subjects were divided into three equal groups of fifteen each. Group – I (n = 15) underwent Resistance Training (RT), Group – II (n = 15) underwent Complex Training (CT) and Group– III (n = 15) acted as control. The speed was measured through 50 meters sprint test, agility was measured by T-test.

### **Training Protocol**

Group I underwent resistance for three days per week for twelve weeks with 2-4 sets: 8-10 repetitions, and group II underwent complex training for three days per week for twelve weeks with 2-4 sets: 8-10 repetitions along with 2 min rest. In every day training session, the work out lasted approximately between 45 minutes, which included warming up and limbering down.

# **Experimental Design and Statistical Technique**

The experimental design in this study was random group design involving 45subjects. The collected data from the three groups prior to and post experimentation on speed and agility were statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). Since three groups were involved, whenever the obtained 'F' ratio value was found to be significant for adjusted post test means, the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any.

# Results

The data collected before and after the experimental period on speed of experimental and control group were analysed and presented in table – I.

## Table - I

Analysis of Covariance on Speed of Resistance and Complex Training and Control Groups

	<b>Resistance</b> Training	Complex Training	Control Group	S O V	Sum of Squares	df	Mean squares	'F' ratio
Pre test Mean SD	7.95	7.88	7.85	В	0.080	2	0.040	0.28
	0.35	0.36	0.41	W	5.99	42	0.14	
Post test Mean SD	7.34	7.05	7.78	В	3.52	2	1.76	24 24*
	0.27	0.15	0.34	W	3.05	42	0.07	
Adjusted Post test Mean	7.32	7.07	7.79	В	3.57	2	1.78	24.87*
				W	2.94	41	0.07	

\*Significant at .05 level of confidence (The required table value for significance at 0.05 level of confidence with degree of freedom 2 and 42 is 3.22 and degrees of freedom 2 and 41 is 3.23)

Table shows that the pre test means and standard deviation (SD) on speed of resistance and complex training and control groups are  $7.95 \pm 0.35$ ,  $7.88 \pm 0.36$  and  $7.85 \pm 0.41$  in that order. The attained 'F' ratio assessment of 0.28 was not as much of the essential table score of 3.22 for the quantity of freedom 2 and 42 at 0.05 level of pledge, which shows that the informal mission of the subjects were a success because the pre check scores on speed among groups didn't vary drastically.

The post take means and SD on speed of resistance and complex training and control groups are 7.34  $\pm$  0.27, 7.05  $\pm$  0.15 and 7.78  $\pm$  0.34 in that order. The attained 'F' ratio assessment of 24.24 on speed was as much of the essential table score of 3.22 for the

quantity of freedom 2 and 42 at 0.05 level of pledge. It implies that important variation existed between the groups on the post test phase on speed.

The adjusted post-test means on speed of resistance and complex training and control groups are 7.32, 7.07 and 7.79 respectively. The attained 'F' ratio assessment is 24.87 of speed was as much of the essential table score of 3.23 for the quantity of freedom 2 and 41 at 0.05 level of assurance. The outcome of the study tells that, major differences be presented among experimental and control groups on speed.

Since, the adjusted post test mean 'F' value was found to be considerable, the data on speed is subjected to post hoc analysis using Scheffe'S test and the results are offered in table–II.

### Table – II

Scheffe'S Test for the Differences between the Adjusted Post Test Paired Means on Speed

Ad	justed Post Test Mea	Mean	Confidence	
Resistance Training	Complex Training	Control Group	Differences	Interval
7.32	7.07		0.25*	0.24
7.32		7.79	0.47*	0.24
	7.07	7.79	0.72*	0.24

\*Significant at .05 level.

Table–II shows that the adjusted post test mean differences on speed between resistance and complex training groups; resistance and control groups; complex training and control groups. The result indicates that there were significant difference among the experimental and control groups on speed of the women kabaddi players. Hence, complex training had better stimulation to increase on speed of women kabaddi players.



Figure -1

The data collected before and after the experimental period on agility of

experimental and control group were analysed and presented in table – III.

	<b>Resistance</b> Training	Complex Training	Control Group	S O V	Sum of Squares	df	Mean squares	'F' ratio
Pre test Mean SD	10.18	10.11	10.23	В	0.10	2	0.05	0.40
	0.44	0.27	0.30	W	5.18	42	0.12	
Post test Mean SD	9.34	9.00	10.22	В	12.03	2	6.01	53.05*
	0.34	0.31	0.34	W	4.76	42	0.11	
Adjusted Post test Mean	9.33	9.04	10.19	В	10.57	2	5.28	78.78*
				W	2.75	41	0.06	

Resistance & Complex Training and Control Groups Analysed by ANCOVA on Agility

\*Significant at .05 level of confidence (The required table value at 0.05 level of confidence with df 2 and 42 is 3.22 and df 2 and 41 is 3.23)

Table–3 shows that the pre test means and standard deviation (SD) on agility of resistance & complex training and control groups are  $10.18 \pm 0.44$ ,  $10.11 \pm 0.27$  and  $10.23 \pm 0.30$  in that order. The attained 'F' ratio assessment of 0.40 was not as much of the essential table score of 3.22 for the quantity of freedom 2 and 42 at 0.05 level of pledge, which shows that the informal mission of the subjects were a success because the pre check scores on agility among groups didn't vary drastically.

The post-take means and SD on agility of resistance & complex training and control groups are  $9.34 \pm 0.34$ ,  $9.00 \pm 0.31$  and  $10.22 \pm 0.34$  in that order. The attained 'F' ratio assessment of 53.05 on agility was as much of the essential table score of 3.22 for the quantity of freedom 2 and 42 at 0.05 level of pledge. It implies that important variation existed between the groups on the post test phase on agility.

The adjusted post-test means on agility of resistance & complex training and control groups are 9.33, 9.04 and 10.19 respectively. The attained 'F' ratio assessment is 78.78 of agility was as much of the essential table score of 3.23 for the quantity of freedom 2 and 41 at 0.05 level of assurance. The outcome of the study tells that, major differences be presented among experimental and control groups on agility. Since, the adjusted post test mean 'F' value was found to be considerable, the data on agility is subjected to post hoc analysis using Scheffe'S test and the results are offered in table–4.

Table – 4 Scheffe's Test on Agility

Ac	ljusted Post Test Mea	Mean	Confidence	
Resistance Training	Complex Training	mplex Training Control Group		Interval
9.33	9.04		0.29*	0.22
9.33		10.19	0.86*	0.22
	9.04	10.19	1.15*	0.22

\*Significant at .05 level.

Table–4 shows that the adjusted post test mean differences on agility between resistance and complex training groups; resistance training and control groups; complex training and control groups. The result indicates that there were significant difference among the experimental and control groups on agility of the women kabaddi players. Hence, complex training had well increase on agility of women kabaddi players.

#### Figure -2



#### **Pyramid Diagram on Agility**

#### **Discussion on Findings**

# Speed

The result of the study inform that twelve weeks of resistance, complex training induced to increase on speed of women kabaddi players when compared to the control group players. Hence, complex training had better stimulation to increase on speed of women kabaddi players. The following studies are strengthening the present results. Corn and Knudson (2003) found that towing with an elastic cord during the acceleration phase resulted in significant differences in running speed, stride length and touchdown distance of the contact foot between the free sprint and the assisted sprint. Hence it is suggested that

for long-lasting change, there needs to be a systematic administration of a sufficient stimulus, followed by an adaptation of the individual, and then the introduction of a new, progressively greater stimulus.

Resistance during sprinting has been proposed to increase force output in the lower extremity, increase stride length, and increase explosiveness during initial strides (Costello, 1985). The group that used complex training resistance and plyometric (combined methods) was the only group that showed significant increases in both strength and power (Fatouros and others, 2000). Muthuraj (2016) investigate the effect of interval training on speed of college men. The result of the study proved that due to the effect of interval training the speed significantly improved for college men.

# Agility

The result of the study informed that twelve weeks of resistance and complex training induced to increase on agility of the women kabaddi players, when compared to control group women kabaddi players. Among experimental training groups complex training had well increase on agility of women kabaddi players. The following studies are supporting the current result. Sathees and Simson (2017) conducted study is to evaluate the effectiveness of a complex training program on skill related physical fitness in hockey players. The complex training program intervention for 6 weeks improved their skill related physical fitness of the hockey players. Jeffrey and Haris (2020) conduct the effect of Complex training on vertical jump (VJ) performance. Complex training can serve as alternative training from RT in improving VJ performance. Divar (2018) examined shortterm effects of complex training program on the sprint and vertical jump ability of soccer player. There were changed the result meaningful had reaction speed time and height in the vertical jump in the subjects In pre-test and post-test. Lesinski and others (2014) conducted Effects of complex training on strength and speed performance in athletes. Complex training represents an effective training regimen for athletes if the goal is to enhance strength, power, and speed.

# Conclusions

The conclusion of the study inform that twelve weeks of resistance, complex training induced to increase on speed and agility of women kabaddi players when compared to the control group players.

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